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RYAN, MASON & LEWIS, LLP
90 FOREST AVENUE
LOCUST VALLEY, NY 11560

EXAMINER	
STRANGE, AARON N	

ART UNIT	PAPER NUMBER
2153	

DATE MAILED: 08/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/718,143	SHABTAY, LIOR	
	Examiner	Art Unit	
	Aaron Strange	2153	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,11-24 and 28-41* is/are rejected.

7)☒ Claim(s) *8-10 and 25-27* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. In view of the appeal brief filed on 5/18/2005, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

2. In light of Applicant's assertion that the load balancer and accelerator are discrete elements (Page 6, Line 20 to Page 7, Line 9 of Appeal Brief filed 5/18/2005), and evidence cited in the specification, a new grounds of rejection is presented below in which Bernstein et al. (US 6,157,644) teaches the use of a discrete accelerator element. It is important to note that while the current claims do not specifically recite that the load balancer and accelerator are discrete elements, they have been interpreted as such in light of Applicant's arguments.

Claim Objections

3. Claims 3 and 9 are objected to because of the following informalities:

Appropriate correction is required.

4. With regard to claim 3, there appears to be a typographical error "comparing two parameters of the packets to a respective field in the list" in lines 2-3. The Examiner recommends that the claim be amended to recite "comparing two parameters of the packets to respective fields in the list".

5. With regard to claim 9, there appears to be a typographical error "comparing the destination port of the packets to respective fields in the list" in lines 2-3. The Examiner recommends that the claim be amended to recite "comparing the destination port of packets to a respective field in the list".

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.**

7. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. With regard to claim 6, the limitation "determining whether the packets math an entry of the list comprises comparing the source IP address and source port of the packets to respective fields in the list" is not clear, since these parameters are modified by the load balancer when it is operating in the second mode, as claimed in claim 1. No mode of operation is specified in claim 6 or any claim from which it depends. The Examiner recommends that the claim be amended to specify that the load balancer operates in the first mode when these parameters are used. For the purpose of applying prior art to claim 6, it has been interpreted that the load balancer must be operating in the first mode in order for the limitations of claim 6 to apply.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1-5,7,11-17, 19, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brendel et al. (US 5,774,660) in view of Bayeh et al. (US 6,098,093) in further view of Applicant's admitted prior art in further view of Bernstein et al. (US 6,157,644).

11. With regard to claim 1, Brendel discloses a method of accelerating the operation of a load balancer by an accelerator comprising: receiving, by the accelerator, packets directed to the load balancer (Col 12, Lines 7-17) the load balancer being configured to operate in a first mode, wherein the load balancer operating in the first mode changes at least one of a destination IP address (Real IP address replaces virtual IP) (Col 16, Lines 55-63) and a destination port of one or more packets it forwards; determining, for at least one of the received packets, whether the packets match an entry of a list of packet groups (session table); and forwarding, by the accelerator, at least one of the received packets, directly to its destination, responsive to the determining (Subsequent packets of a session are forwarded without being load balanced)(Col 12, Lines 59-63). However, Brendel fails to specifically disclose that the accelerator and the load balancer are discrete elements, the specific number or identity of parameters compared to respective fields of entries of the list or that the load balancer is configured to operate in a second mode wherein the load balancer operating in the second mode changes at least a source IP address and a destination IP address of one or more packets it forwards.

Bayeh teaches that the use of session identifiers to allow sessions to be maintained in a load balancing environment is old and well known in the art. Session identifiers uniquely identify each session and are sent by the client as part of the request packets (Bayeh, Col 3, Lines 5-19). Session identifiers provide a simple method of uniquely identifying a session between a client and server and are not changed by the load balancer.

Applicant admits that operating the load balancer in a second mode wherein the load balancer changes at least a source IP address and a destination IP address is well known in the art (Present Application Page 2, Lines 11-13). This is called full network address translation (NAT), and is commonly used in networks where enhanced security is desired.

Bernstein teaches the use of a discrete accelerator switch to accelerate the operation of a router. The switch receives packets and compares them to a stored list. If a packet matches an entry in the list, it is forwarded to its destination without passing through the router. If the packet does not match an entry in the list it is sent to the router, which computes the destination of the packet and sends it back to the accelerator. This would have been an advantageous addition to the system disclosed by Brendel and Bayeh since it would allow packets to bypass the load balancer and be sent directly to their destination by the accelerator switch, reducing load on the load balancer and speeding up data transfer.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to use session identifiers as disclosed by Bayeh, a discrete accelerator switch as taught by Bernstein and allow the load balancer to operate in full NAT mode. The use of session identifiers provides a unique identifier for each session, and requires the comparison of only a single parameter. This speeds up the operation of the accelerator and reduces the overall latency of the connection. A discrete accelerator element reduces load on the load balancer by intercepting packets

and forwarding them itself, and the use of full NAT is a well known means of increasing security of a network.

12. With regard to claims 2 and 4, Bayeh further discloses that determining whether the packets match an entry of the list comprises comparing three or fewer parameters (a single parameter) of the packets to respective fields in the list (Session identifier) (Col 3, Lines 5-19).

13. With regard to claim 3, while the system disclosed by Brendel in view of Bayeh shows substantial features of the claimed invention (discussed above) it fails to specifically disclose that determining whether the packets match an entry of the list comprises comparing two parameters of the packets to respective fields in the list.

However, it is clear that the number of parameters is flexible based on the operating environment of the system and adding additional parameters to the comparison as needed would have been a matter of preference for the system designer to ensure that sessions could be uniquely identified.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine whether the packets match an entry of the list by comparing two parameters of the packets to respective fields in the list. This would have allowed the system designer to use an additional parameter as needed to ensure that sessions could be uniquely identified.

14. With regard to claim 5, Brendel further discloses that receiving packets directed to the load balancer comprises receiving packets directed from a client to a Web site (URL requests) (Col 12, Line 55 to Col 13, Line 4) associated with the load balancer and forwarding at least one of the received packets directly to its destination comprises forwarding the packets from the clients to one of the servers of the Web site without passing through the load balancer (subsequent packets are passed through without being load balanced) (Col 12, Lines 59-63).

15. With regard to claim 7, Bayeh further discloses that the compared parameters do not include a destination address (Session identifier is the only parameter needed to identify the session) (Bayeh, Col 3, Lines 5-19).

16. With regard to claim 11, Brendel further discloses that forwarding at least one of the received packets comprises forwarding packets for which a matching entry was found (subsequent packets from the same session are passed through without being load balanced) (Col 12, Lines 59-63).

17. With regard to claim 12, Brendel further discloses that the load balancer is operating in half NAT or full NAT mode (Real IP address replaces virtual IP, half NAT) (Col 16, Lines 55-63).

18. With regard to claim 13, Brendel discloses a method of creating an entry in a list which correlates between packet groups and respective destination servers, comprising: receiving, by an accelerator, a packet directed from or to a load balancer, the load balancer being configured to operate in a first mode, wherein the load balancer operating in the first mode changes at least one of a destination IP address (Real IP address replaces virtual IP) (Col 16, Lines 55-63) and a destination port of one or more packets it forwards; and creating, by the accelerator, an entry in the list of destination servers (session table), responsive to the received packet (Col 12, Lines 6-24). Brendel fails to specifically disclose that that the accelerator and the load balancer are discrete elements or that the load balancer is configured to operate in a second mode wherein the load balancer operating in the second mode changes at least a source IP address and a destination IP address of one or more packets it forwards or that the entry comprises parameters not changed by the load balancer.

Bayeh teaches that the use of session identifiers to allow sessions to be maintained in a load balancing environment is old and well known in the art. Session identifiers uniquely identify each session and are sent by the client as part of the request packets (Bayeh, Col 3, Lines 5-19). Session identifiers provide a simple method of uniquely identifying a session between a client and server and are not changed by the load balancer.

Applicant admits that operating the load balancer in a second mode wherein the load balancer changes at least a source IP address and a destination IP address is well known in the art (Present Application Page 2, Lines 11-13). This is called full network

address translation (NAT), and is commonly used in networks where enhanced security is desired. This is advantageous for networks where security is a concern since full NAT forces all client server communication to travel through the node balancer node, allowing all traffic to be monitored and policed at the load balancer node and preventing clients and servers from learning the addressing information of each other.

Bernstein teaches the use of a discrete accelerator switch to accelerate the operation of a router. The switch receives packets and compares them to a stored list. If a packet matches an entry in the list, it is forwarded to its destination without passing through the router. If the packet does not match an entry in the list it is sent to the router, which computes the destination of the packet and sends it back to the accelerator. This would have been an advantageous addition to the system disclosed by Brendel and Bayeh since it would allow packets to bypass the load balancer and be sent directly to their destination by the accelerator switch, reducing load on the load balancer and speeding up data transfer.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to use session identifiers as disclosed by Bayeh, a discrete accelerator switch as taught by Bernstein, and allow the load balancer to operate in full NAT mode. The use of session identifiers provides a unique identifier for each session, and prevents the identifier from being modified by the load balancer. A discrete accelerator element reduces load on the load balancer by intercepting packets and forwarding them itself, and the use of full NAT is a well known means of increasing security of a network.

19. With regard to claim 14, Brendel further discloses that creating the entry comprises creating an entry which does not include a destination address of a web site (The real IP is used to identify the destination servers. The web site destination address is the virtual IP address) (Col 7, Lines 14-29).

20. With regard to claim 15, Brendel further discloses that the packet is directed to or from a load balancer operating in half NAT mode (The virtual IP is replaced with a real IP address, but the source address is not changed) (Col 16, Lines 55-63).

21. With regard to claim 16, as discussed regarding claim 1, operating the load balancer in a full NAT mode is an obvious modification of the system.

22. With regard to claim 17, Brendel further discloses that receiving the packet comprises receiving a packet directed from the load balancer to a server (Packet is forwarded to a server once it has been assigned) (Col 12, Lines 55-58).

23. With regard to claim 19, Bayeh further discloses that creating the entry comprises creating the entry using only information in the received packet as it was received (session identifier is in the request packet) (Col 3, Lines 9-10).

24. With regard to claim 23, while the system disclosed by Brendel in view of Bayeh shows substantial features of the claimed invention (discussed above), it fails to disclose an additional load balancer using the same accelerator.

Brendel discloses the presence of multiple load balancers for redundancy in case the primary load balancer fails (Col 18, Lines 44-54). However, it would have been advantageous to have load balancers share the accelerator in order to reduce the number of accelerators required.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to allow multiple load balancers to share a single accelerator, creating a single entry point into the network, and ensuring different sessions are not accidentally assigned the same session ID by different accelerators. This would prevent packets from being incorrectly routed to the wrong server.

25. Claims 28-41 are rejected under 35 U.S.C. 102(b) as being anticipated by Brendel et al. (US 5,774,660) in view of Bernstein et al. (US 6,157,644).

26. With regard to claim 28, Brendel discloses a load balancing accelerator, comprising: an input interface which receives packets directed to a load balancer (packets are routed to the load balancer) (Col 12, Lines 13-17); a table which lists packet groups and their respective destination servers, the table having physical entries which can accommodate different field sets for storage of data entries (session table) (Col 12, Lines 6-24); a comparator which compares at least one of the packets directed

to the load balancer to one or more of the data entries of the table (determine whether a packet is from a session in the session table); a forwarding unit which forwards at least one of the packets for which a match was found by the comparator, directly to a server, responsive to the contents of the matching data entry (Further packets from the same session are passed through without being load balanced) (Col 12, Line 59 to Col 13, Line 16); and a controller which determines in which field set, from the plurality of different field sets, each of the data entries of the table is stored (The load balancer creates an entry in the session table). However, Brendel fails to specifically disclose that the load balancer and the accelerator are discrete elements.

Bernstein teaches the use of a discrete accelerator switch to accelerate the operation of a router. The switch receives packets and compares them to a stored list. If a packet matches an entry in the list, it is forwarded to its destination without passing through the router. If the packet does not match an entry in the list it is sent to the router, which computes the destination of the packet and sends it back to the accelerator. This would have been an advantageous addition to the system disclosed by Brendel since it would allow packets to bypass the load balancer and be sent directly to their destination by the accelerator switch, reducing load on the load balancer and speeding up data transfer.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to use a discrete accelerator switch as taught by Bernstein since a discrete accelerator element reduces load on the load balancer by intercepting packets and forwarding them itself.

27. With regard to claims 29, 30, and 31, while the system disclosed by Brendel shows substantial features of the claimed invention (discussed above), it fails to disclose how the controller determines the field sets in which the data entries are stored.

However, it is clear that the method of determining the field sets in which to place the data entries does not affect the functionality of the invention. Any method that chooses the correct field sets to use for a particular application would be acceptable. In some applications, it would be advantageous to have a user interface through which a user may configure the desired field sets in order to give the system administrator more control over the acceleration process. In other applications, it would be advantageous to have the controller automatically determine the appropriate field sets by analyzing responses from the load balancer. For example, responses from the load balancer can be analyzed and it can be determined what mode the load balancer is operating in such as half NAT, full NAT, or triangulation.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any one of a plurality of methods for determining the field sets in which to store data entries. Different application can benefit from different methods of determining the appropriate field sets. A user interface provides more control over the acceleration process while automating the determination speeds up the process and reduces the need for user intervention.

28. With regard to claim 32, Brendel further discloses that the controller determines the field sets in which the data entries of the table are stored, such that at a single time all of the data entries are stored in the same field sets (session table entries) (Col 12, Lines 13-17).

29. With regard to claims 33,35 and 36, while the system disclosed by Brendel shows substantial features of the claimed invention (discussed above), it fails to disclose that that the controller determines the field sets in which the data entries of the table are stored, such that at least during some periods of operation of the accelerator, the table includes at least two data entries stored in different field sets. Brendel fail to disclose the specific components of entries in the table as well as the conditions under which they may change.

Brendel discloses that the load balancer may operate in triangulation or half NAT mode. It is well known that theses two modes of operation perform different modifications to the packets that are received by the load balancer, in particular the destination address. As a result, the information located in the session table depends upon the mode the load balancer is operating in. The accelerator must be capable of creating entries for any possible operation mode of the load balancer. In the event that the accelerator services two or more load balancers, the accelerator must be capable of creating entries of different types simultaneously, and having entries which use different field sets coexist in the table. It would be functionally equivalent to separate the entries

for each load balancer into sub-tables having different field sets and store the sub tables as part of the table.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to ensure that the accelerator was capable of creating table entries for each mode of operation of the load balancer as well as maintaining entries for multiple load balancers operating in different modes simultaneously, either is one table or a plurality of sub tables. This allows a single accelerator to service multiple load balancers operating in different modes.

30. With regard to claim 34, while the system disclosed by Brendel shows substantial features of the claimed invention (discussed above), it fails to disclose that at least one of the physical entries of the table can be configured for use with different field sets.

However, the primary difference between the different entry types is the addition of more fields to entries for load balancers operating in half NAT or full NAT mode. The information needed for accelerating a load balancer operating in triangulation mode is located in the entry for a load balancer operating in half NAT or full NAT mode. Therefore, a triangulation load balancer could use entries for a half NAT balancer by dropping the unnecessary fields when reading the table. Entries for a half or full NAT balancer could be converted to entries for a triangulation balancer when a balancer changes modes during operation. This would allow the acceleration to continue without losing any previously established sessions.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to allow a single physical entry to be configures for use with different field sets. This would allow the accelerator to adapt to a change in the mode of operation of the load balancer without causing any previously established sessions to fail.

31. With regard to claim 37, Brendel discloses a load balancing accelerator, comprising: an input interface which receives packets directed to a load balancer (packets are routed to the load balancer) (Col 12, Lines 13-17); a table which lists packet groups and their respective destination servers (session table) (Col 12, Lines 6-24); a comparator which compares at least one of the packets directed to the load balancer to at least one of the entries of the table (determine whether a packet is from a session in the session table); a forwarding unit which forwards directly to a server, at least one of the packets for which a match was found by the comparator, responsive to the contents of the matching entry (Further packets from the same session are passed through without being load balanced) (Col 12, Line 59 to Col 13, Line 16), the forwarding unit being capable of operating in a plurality of operation modes (half NAT or triangulation), at least one of the operation modes including changing at least one of the fields of the forwarded packets (Real IP address replaces virtual IP) (Col 16, Lines 55-63). A controller which determines in which mode the forwarding unit operates is inherent to the system disclosed by Brendel. Without a controller to determine the mode of operation, the device could not operate in multiple modes since it would have no way

to determine which mode to operate in. However, Brendel fails to specifically disclose that the load balancer and the accelerator are discrete elements.

Bernstein teaches the use of a discrete accelerator switch to accelerate the operation of a router. The switch receives packets and compares them to a stored list. If a packet matches an entry in the list, it is forwarded to its destination without passing through the router. If the packet does not match an entry in the list it is sent to the router, which computes the destination of the packet and sends it back to the accelerator. This would have been an advantageous addition to the system disclosed by Brendel since it would allow packets to bypass the load balancer and be sent directly to their destination by the accelerator switch, reducing load on the load balancer and speeding up data transfer.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to use a discrete accelerator switch as taught by Bernstein since a discrete accelerator element reduces load on the load balancer by intercepting packets and forwarding them itself.

32. With regard to claim 38, Brendel further discloses that that the forwarding unit is capable of performing splicing (Connection is migrated from the load balancer to the server after it is set up) (Col 11, Lines 64-66).

33. With regard to claims 39, 40 and 41, while the system disclosed by Brendel shows substantial features of the claimed invention (discussed above), it fails to disclose how the controller determines in which mode the forwarding unit operates.

However, it is clear that the method of determining the mode in which the forwarding unit operates does not affect the functionality of the invention. It would be advantageous to have the forwarding unit operating in the same mode as the load balancer. This would allow the network to continue functioning exactly as it did before the accelerator was installed. In some applications, it would be advantageous to have a user interface through which a user may configure the desired mode in order to give the system administrator more control over the acceleration process. In other applications, it would be advantageous to have the controller automatically determine the appropriate mode. This could be accomplished by examining the contents of the packets directed to/from the load balancer or by comparing the contents of packets directed to the load balancer to packets coming from the load balancer. For example, responses from the load balancer can be analyzed and it can be determined what mode the load balancer is operating in such as half NAT, full NAT, or triangulation. The mode of operation of the forwarding unit could then be set accordingly.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any one of a plurality of methods for determining the mode of operation of the forwarding unit. Different applications can benefit from different methods of determining the appropriate mode of operation. A user interface provides more control over the acceleration process while automating the determination

speeds up the process, eliminates human error, and reduces the need for user intervention.

34. Claims 18, 20-22, and 24 are are rejected under 35 U.S.C. 103(a) as being unpatentable over Brendel et al. (US 5,774,660) in view of Bayeh et al. (US 6,098,093) in further view of Applicant's admitted prior art in further view of Bernstein et al. (US 6,157,644) in further view of Cisco Systems (White Paper).

35. With regard to claim 18, while the system disclosed by Brendel, Bayeh, and Bernstein shows substantial features of the claimed invention (discussed above), it fails to disclose that receiving the packets comprises receiving a packet directed from a server to the load balancer. The servers disclosed by Brendel reply directly to the clients, bypassing the load balancer's node entirely.

Cisco Systems teach the creation of entries for packets directed to the load balancer by a server. The process is essentially the same for packets headed to the servers (Page 10, Lines 3-12). When the load balancer is operating in full NAT mode, packets cannot be sent directly to the clients via an alternate route since the addresses of the clients are not known by the server. These packets must be sent back to the load balancer. It would be advantageous to provide acceleration for packets in this direction as well. Furthermore, packets traveling in this direction cannot be load balanced since they must go to the requesting client.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide acceleration for packets traveling from the servers back to the load balancer as disclosed by Cisco Systems. This would reduce the amount of packets the load balancer would need to examine, speeding up the transmission of packets in this direction.

36. With regard to claim 20, while the system disclosed by Brendel, Bayeh, and Bernstein shows substantial features of the claimed invention (discussed above), it fails to disclose that creating the entry comprises creating the entry using information not included in the received packet as it was received.

Cisco Systems teaches a method of creating an entry in a session table that uses information from the received packet and information from a copy of the received packet which is forwarded to the load balancer. Cisco Systems disclose that packets which are potential sessions are cached when they are received from the client. The packet is forwarded to the load balancer. If the load balancer changes the destination address in the returned packet, the accelerator validates the flow and completes the entry. All future packets belonging to the same session bypass the load balancer (Page 9, Line 14 to Page 10, Line 2). This method allows for the identification of the beginning and end of individual sessions as well as enables the accelerator to detect the mode of operation of the load balancer based upon the differences between the two packets.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to use the method of creating an session entry disclosed

by Cisco Systems to create entries in the session table disclosed by Brendel. This method allows for the identification of the beginning and end of individual sessions as well as enables the accelerator to detect the mode of operation of the load balancer based upon the differences between the two packets. The identification information for subsequent packets of the session may then be appropriately chosen based upon the load balancer's mode of operation.

37. With regard to claim 21, as discussed regarding claim 20, creating the entry comprises creating the entry using information from a copy of the received packet, previously received by the accelerator.

38. With regard to claim 22, as discussed regarding claims 20 and 21, creating the entry comprises receiving a packet from the load balancer and creating the entry comprises creating an entry using information from the received packet and from a copy of the received packet forwarded to the load balancer.

39. With regard to claim 24, while the system disclosed by Brendel, Bayeh, and Bernstein shows substantial features of the claimed invention (discussed above), it fails to disclose the storing of identification information and values of one or more parameters of the packets directed to the Web site, in a temporary storage; and searching the temporary storage for an entry which matches the received packet from

the load balancer, wherein creating the entry in the list of destination servers of packets groups is performed only if a match is found.

Cisco Systems teach the process of storing identification information and values of one or more parameters of the packets directed to the Web site in a temporary storage (cache flow information of potential session); and searching the temporary storage for an entry which matches a packet directed from the load balancer (look to see if received packet matches cached information); wherein creating the entry in the list of destination servers of packets groups is performed only if a match is found (modified packet received from load balancer triggers creation of valid entry) (Page 9, Line 14 to Page 10, Line 2). This process ensures that only valid sessions are entered into the table, reducing the amount of session entries. This also prevents invalid sessions from taking entries in the table away from valid sessions, increasing the efficiency of the accelerator.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to modify the system disclosed by Brendel, Bayeh, and Bernstein to use a temporary storage to hold information about potential sessions. Once the sessions have been confirmed by a response form the load balancer, a permanent entry can be made in the table. This ensures that only valid sessions are placed in the session table, increasing the efficiency of the acceleration process.

40. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brendel et al. (US 5,774,660) in view of RFC 2391 in further view of Bernstein et al. (US 6,157,644).

41. For the purpose of applying prior art, it has been assumed that the load balancer must be operating in the first mode in order for the limitations of claim 6 to apply. Refer to 35 USC 112 2nd Paragraph rejection of claim 6 for further information.

42. With regard to claim 6, Brendel discloses a method of accelerating the operation of a load balancer by an accelerator switch comprising: receiving, by the accelerator switch, packets directed to the load balancer(Col 12, Lines 7-17) the load balancer being configured to operate in a first mode, wherein the load balancer operating in the first mode changes at least one of a destination IP address (Real IP address replaces virtual IP) (Col 16, Lines 55-63) and a destination port of one or more packets it forwards; determining, for at least one of the received packets, whether the packets match an entry of a list of packet groups (session table); and forwarding, by the accelerator switch, at least one of the received packets, directly to its destination, responsive to the determining (Subsequent packets of a session are forwarded without being load balanced)(Col 12, Lines 59-63). Brendel further discloses the limitations set forth in claim 5 (discussed above). However, Brendel fails to disclose the specific number or identity of parameters compared to respective fields of entries of the list or that that the accelerator and the load balancer are discrete elements.

HTTP uses TCP as a transport and RFC 2391 discloses that TCP connections are defined using source/destination addresses and source/destination ports (Page 4, Lines 5-7). A TCP connection can be uniquely identified using only these parameters. In order to identify which server to send the request to, the accelerator needs to look only at the source IP and port to determine which connection the packet belongs to. Once the correct connection is determined, the packet can be properly routed to the correct server. Comparing only these two parameters speeds up the operation of the accelerator since unnecessary parameters are not being compared, and these parameters are not modified by a load balancer operating in half-NAT mode.

Bernstein teaches the use of a discrete accelerator switch to accelerate the operation of a router. The switch receives packets and compares them to a stored list. If a packet matches an entry in the list, it is forwarded to its destination without passing through the router. If the packet does not match an entry in the list it is sent to the router, which computes the destination of the packet and sends it back to the accelerator. This would have been an advantageous addition to the system disclosed by Brendel since it would allow packets to bypass the load balancer and be sent directly to their destination by the accelerator switch, reducing load on the load balancer and speeding up data transfer.

Therefore, it would have been obvious to anyone of ordinary skill in the art at the time the invention was made to use the source IP/port to identify the connection. The use of source IP/port allows a session to be uniquely identified and requires the comparison of only two parameters, speeding up operation of the accelerator. It would

also have been obvious to use a discrete accelerator switch as taught by Bernstein since a discrete accelerator element reduces load on the load balancer by intercepting packets and forwarding them itself.

Allowable Subject Matter

43. Claims 8-10 and 25-27 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

44. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron Strange whose telephone number is 571-272-3959. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glen Burgess can be reached on 571-272-3949. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AS
8/5/2005

Dung C.
Primary